

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

June 2001

BUDGET ACTIVITY

5 - ENG MANUFACTURING DEV

PE NUMBER AND TITLE

0604746A - Automatic Test Equipment Development

COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	15585	12837	11582	0	0	0	0	0	0	0
L59 DIAGNOST/EXPERT SYS DE	12716	3509	3568	0	0	0	0	0	0	0
L65 TEST EQUIPMENT DEVELOPMENT	2869	2960	982	0	0	0	0	0	0	0
L66 EMBEDDED DIAGNOSTICS/PROGNOSTICS DEVELOPMENT	0	6368	7032	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

PLEASE NOTE: This administration has not addressed FY2003-2007 requirements. All FY 2003-2007 budget estimates included in this book are notional only and subject to change.

This program element provides for the development of diagnostic/prognostic hardware and software to support the increasingly complex electronics of Army weapon systems. The program focuses on commercial state-of-the-art test technologies which are common to multiple weapons platforms to minimize the cost of troubleshooting and maintenance in the field. Expert systems and artificial intelligence applications are being developed under this program element as part of the Army Diagnostics Improvement Program (ADIP) to support the overall Army strategy of improving the self-diagnostic capability of weapon systems through use of embedded sensors and built-in diagnostics. The goal of embedding diagnostics is to minimize the need for external testers and to improve the troubleshooting abilities of soldiers in the field. This program element further provides for the development of modular, reconfigurable automatic and semi-automatic systems to satisfy the test and diagnostic requirements of Army weapon systems and also the calibration and repair requirements of Army general purpose test, measurement, and diagnostic equipment. A rapidly deployable calibration set with emphasis on digital electronics and tailored to support Army field units is being developed to alleviate the serious deployability and survivability shortfalls in the current systems, and the Army's participation in development of a Joint Service automatic test system is funded through this program. This project supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).

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<u>B. Program Change Summary</u>	FY 2000	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	16063	12956	8332	0
Appropriated Value	16252	12956	0	
Adjustments to Appropriated Value	0	0	0	
a. Congressional General Reductions	0	0	0	
b. SBIR / STTR	-423	0	0	
c. Omnibus or Other Above Threshold Reductions (Inflation)	-65	0	0	
d. Below Threshold Reprogramming	-55	0	0	
e. Rescissions	-124	-119	0	
Adjustments to Budget Years Since FY2001 PB	0	0	3250	
Current Budget Submit (FY 2002/2003 PB)	15585	12837	11582	0

FY 2002 - Increase of \$3250 funds embedded diagnostic/prognostic developmental projects under the Army Diagnostics Improvement Program

FY 2003 - Increase of \$3442 funds embedded diagnostic/prognostic developmental projects under the Army Diagnostics Improvement Program

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							June 2001			
BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV				PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development				PROJECT L59		
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
L59 DIAGNOST/EXPERT SYS DE	12716	3509	3568	0	0	0	0	0	0	0
<p><u>A. Mission Description and Budget Item Justification:</u> This project funds development of diagnostic systems and general-purpose test and diagnostic equipment. These systems and equipment are required to overcome existing deficiencies and voids in organic test and diagnostic capabilities and to ensure the operational readiness, accuracy, and effectiveness of the Army's weapons and combat support systems. The project provides for development of diagnostic technologies and state-of-the-art general-purpose automatic test equipment to support the Army's weapon systems; improvement of general-purpose automatic test equipment to meet new testing and technological requirements; market surveys of commercially available test equipment, methods, and procedures to determine applicability to Army requirements; and development and validation of test and diagnostic software. Applications of state-of-the-art technologies and electro-optical diagnostics for battlefield use will be developed to meet identified requirements. This project supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).</p> <p><u>FY 2000 Accomplishments</u></p> <ul style="list-style-type: none"> • 1390 Expanded ground vehicle-based anticipatory maintenance system to brigade level. • 1519 Developed initial helicopter-based anticipatory maintenance system. • 1444 Developed horizontal technology insertion interface for the Bradley Fighting Vehicle System. • 7021 Completed preplanned product improvement program and testing of Electro-Optics Test Facility (EOTF). • 1342 Developed EOTF test programs. <p>Total 12716</p>										

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PROJECT

L59

FY 2001 Planned Program

- 1000 Evaluate new hardware upgrades for the Integrated Family of Test Equipment (IFTE).
- 482 Conduct user assessment of EOTF.
- 934 Develop and evaluate new software applications for the IFTE.
- 1000 Commence Army developmental efforts on a Department of Defense (DoD) joint service automatic test system.
- 93 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).

Total 3509

FY 2002 Planned Program

- 1400 Evaluate hardware enhancements for new Integrated Family of Test Equipment (IFTE) test requirements.
- 1002 Continue development of new software test applications for the IFTE.
- 1166 Continue developmental efforts on Department of Defense (DoD) joint service automatic test system.

Total 3568

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PROJECT

L59

B. Other Program Funding Summary

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
OPA3, MB4000, Integrated Family of Test Equipment (IFTE)	65538	67754	52397	0	0	0	0	0	0	0

C. Acquisition Strategy: This project funds a number of separate but related efforts to develop and upgrade general-purpose automatic test equipment and diagnostic software to support Army weapon systems. The projects are managed by the Product Manager, Automatic Test Support Systems and are focused on ensuring maximum use of commercial technologies and equipment to satisfy the Army's test and diagnostic requirements. When the necessary expertise and capability are available within the Department of Defense (DoD), services required for the individual developmental projects are ordered from the government source; otherwise, commercial contracts are used. Equipment required for developmental projects is obtained by contract from the commercial supplier. Developmental efforts on the Electro-Optics Test Facility (EOTF) preplanned product improvement program are being completed under a sole source contract awarded to the prime contractor for the system. The Army will participate with the other services in development of a DoD standard automatic test system. The Army requirement is stated in the Integrated Family of Test Equipment (IFTE) operational requirements document (ORD). This developmental effort will be competitive contractual action and is being managed by a joint service NxTest Technical Working Group.

D. Schedule Profile

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
IFTE ORD Approval	2Q			0	0	0	0	0
Complete EOTF User Assessment			1Q	0	0	0	0	0
EOTF Type Classification-Standard/Materiel Release Approval				0	0	0	0	0
EOTF Initial Operational Capability				0	0	0	0	0

NOTE: This is a continuing program of developmental activities to provide a means for satisfying test and diagnostic support requirements of Army weapon systems. It consists of a number of similar and related efforts, many of which do not entail distinct major milestones.

ARMY RDT&E COST ANALYSIS(R-3)										June 2001		
BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV					PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development					PROJECT L59		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Systems Engineering	SS/CPFF	Northrop Grumman, Rolling Meadows, IL	3225	978	2-3Q	689	2-3Q	0	0	0	0	0
b . Software Development	SS/CPFF	Northrop Grumman, Rolling Meadows, IL	1716	663	1-3Q	559	2-3Q	0	0	0	0	0
c . Systems Engineering	Various	Various	35699	735	1-4Q	659	1-4Q	0	0	0	0	0
d . Software Development	Various	Various	24115	175	1-4Q	586	1-3Q	0	0	0	0	0
e . Testing	Various	Various	4303	200	1-4Q	200	1-4Q	0	0	0	0	0
f . Support Equipment	Various	Various	75	0		0		0	0	0	0	0
g . Government Engineering	Various	Various	7270	200	1-4Q	350	1-4Q	0	0	0	0	0
Subtotal:			76403	2951		3043		0		0	0	0
Remarks: Test and evaluation costs are included as part of the product development costs.												

ARMY RDT&E COST ANALYSIS(R-3)									June 2001			
BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV					PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development					PROJECT L59		
II. Support Cost	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Contractor Technical Services	Various	Various	862	150	1-4Q	150	1-4Q	0	0	0	0	0
b . Integrated Logistics Development	Various	Various	1016	0		0		0	0	0	0	0
c . Training Plans/Material	Various	Various	214	0		0		0	0	0	0	0
d . Technical Publications	Various	Various	625	0		0		0	0	0	0	0
Subtotal:			2717	150		150		0		0	0	0
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal:			0	0		0		0		0	0	0
Remarks: See product development remark.												

ARMY RDT&E COST ANALYSIS(R-3)									June 2001			
BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV					PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development					PROJECT L59		
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Program Management Personnel	In House	Various	6952	408	1-4Q	375	1-4Q	0	0	0	0	0
Subtotal:			6952	408		375		0		0	0	0
Project Total Cost:			86072	3509		3568		0		0	0	0

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PE NUMBER AND TITLE	PROJECT
0604746A - Automatic Test Equipment Development	L66

L66

COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
L66	EMBEDDED DIAGNOSTICS/PROGNOSTICS DEVELOPMENT	0	6368	7032	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project funds the developmental efforts under the Army Diagnostics Improvement Program (ADIP). The ADIP has three main thrusts: Embed diagnostics on all major Army platforms, develop an anticipatory maintenance system, and improve the diagnostics on current systems. Generic procedures, software applications, and hardware devices that can be embedded in weapon systems will be developed and tested under this project. Included in this effort will be a basic, generic Health and Usage Monitoring System for Army helicopters. A similar system will be developed for ground-based systems, and an inexpensive system will be developed for use in the ground-based diesel engine truck fleet. An anticipatory maintenance system for air and ground weapon systems will be developed and tested. This project supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

Funded as part of Project DL59 in FY 2000.

FY 2001 Planned Program

•	1815	Test and evaluate an initial generic, helicopter-based anticipatory maintenance system (a health and usage monitoring system (HUMS)).
•	120	Initiate helicopter-based anticipatory maintenance data collection.
•	1827	Develop and test generic embedded diagnostics for ground vehicles.
•	1951	Test initial predictive maintenance capability for ground vehicles.
•	325	Investigate new technologies for adaptation to Army maintenance.
•	140	Coordinate diagnostics technologies/architectures for new systems.
•	190	Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).
Total	6368	

<u>FY 2000 Accomplishments</u>	Funded as part of Project DL59 in FY 2000.
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Funded as part of Project DL59 in FY 2000.

FY 2001 Planned Program	
1815	Test and evaluate an initial generic, helicopter-based anticipatory maintenance system (a health and usage monitoring system (HUMS)).

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- 120 Initiate helicopter-based anticipatory maintenance data collection.
- 1827 Develop and test generic embedded diagnostics for ground vehicles.
- 1951 Test initial predictive maintenance capability for ground vehicles.
- 325 Investigate new technologies for adaptation to Army maintenance.
- 140 Coordinate diagnostics technologies/architectures for new systems.
- 190 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).

Total	6368
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L66

FY 2002 Planned Program

- 900 Continue to test initial health and usage monitoring system (HUMS).
 - 1941 Adapt and test the generic embedded diagnostics for Paladin.
 - 2034 Finalize predictive maintenance initial operating capability for ground vehicles.
 - 1300 Continue helicopter-based anticipatory maintenance data collection and initiate analysis of data.
 - 697 Continue investigations of new technologies and their application to Army systems.
 - 160 Continue coordination of diagnostic technologies/architectures for new systems.
- Total 7032

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B. Other Program Funding Summary

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
OPA3, N11400, Army Diagnostics Improvement Program	5172	17142	18344	0	0	0	0	0	0	0

C. Acquisition Strategy: This project funds a continuing program for development of maintenance systems, methods, and procedures to improve diagnostic support capabilities for Army weapon systems and for integration of commercial diagnostics applications into Army maintenance concepts. The project is managed by the Product Manager, Automatic Test Support Systems and is focused on ensuring maximum use of commercial technologies to satisfy the Army's test and diagnostic requirements. When the necessary expertise and capability are available within the Department of Defense, services required for the individual initiatives under this project will be ordered from the government source; otherwise, existing or new commercial contracts will be used. Equipment required for developmental projects will be obtained by contract from the commercial supplier. Candidate equipment and maintenance methods will be identified and evaluated through market research and government testing and evaluation.

D. Schedule Profile: Not applicable for this item.

This is a continuing program of developmental activities to improve diagnostics of Army weapons and combat support systems. It consists of a number of similar and related efforts that do not entail distinct major milestones.

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BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV					PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development					PROJECT L66		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Systems Engineering	Various	Various	0	1986	1-4Q	3338	1-4Q	0	0	0	0	0
b . Software Development/ Engineering	Various	Various	0	3453	1-4Q	2844	1-4Q	0	0	0	0	0
c . Testing	Various	Various	0	220	1-4Q	200	1-4Q	0	0	0	0	0
d . Government Engineering	Various	Various	0	200	1-4Q	200	1-4Q	0	0	0	0	0
Subtotal:			0	5859		6582		0		0	0	0
Remarks: Test and evaluation costs are included as part of the product development costs.												
II. Support Cost	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Contractor Technical Services	Various	Various	0	150	1-4Q	150	1-4Q	0	0	0	0	0
Subtotal:			0	150		150		0		0	0	0

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BUDGET ACTIVITY 5 - ENG MANUFACTURING DEV					PE NUMBER AND TITLE 0604746A - Automatic Test Equipment Development					PROJECT L66		
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
			0	0		0		0		0	0	0
Subtotal:												
Remarks: See product development remark.												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Program Management Personnel & Support	In House	Various	0	359	1-4Q	300	1-4Q	0	0	0	0	0
Subtotal:			0	359		300		0		0	0	0
Project Total Cost:			0	6368		7032		0		0	0	0